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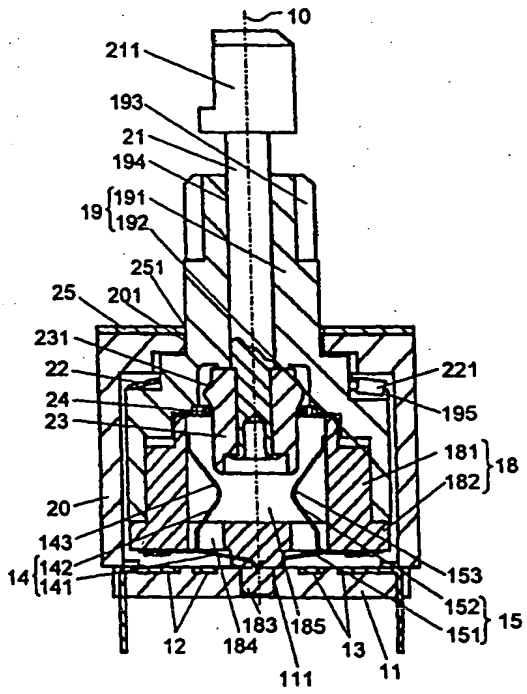
(54) Composite switch

(57) A composite switch comprising a first fixed contact unit and a second fixed contact unit which are disposed on the surface of a substrate in such a manner as to be symmetrical about a reference line which is vertical to the surface of the substrate, a first rotating contact unit which contacts with the first fixed contact unit or the second fixed contact unit, and a second rotating contact unit which contacts with the second fixed contact unit or the first fixed contact unit, wherein both rotating contact units are respectively held by a rotating member which rotates on an axis of the reference line, a first facing contact leg electrically connected to the first rotating contact unit and a second facing contact leg electrically connected to the second rotating contact unit, wherein the two facing contact legs are disposed in such a manner as to face each other across the reference line, a central movable contact member which enters into the state of electrical connection with the first and the second facing contact legs or electrical disconnection from the first and the second contact legs by moving along the reference line, and one or two operating shafts for rotating the rotating member and moving the central movable contact member along the reference line. The above structure enables the simultaneous switching operation on two independent circuits, also enables the short-circuiting of two switching structures in the composite switch for switching operation on one circuit.

FIG. 1



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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a composite switch which performs simultaneous switching operation on a plurality of electrically independent circuits in various electronic apparatuses.

BACKGROUND OF THE INVENTION

[0002] In general, a conventional composite switch has the structure of Fig. 11 which shows a cross sectional front view of the same. As shown in Fig. 11, the composite switch comprises two switches 321 and 322, which respectively have identical specifications and are disposed coaxially in two stages.

[0003] When the composite switch is used, for instance, for adjusting the output level of two circuits which work according to respective signals in the audio apparatus of a stereo system, the switching operation is performed by rotating one operating shaft 303.

[0004] On the other hand, when the audio apparatus is used as one circuit of a monaural system by operating the apparatus with one signal, the common contact point 341 of the switch 321 and the common contact point 342 of the switch 322 are short-circuited by using another switch 305 as shown in Fig. 12 so that the composite switch enters into the state for switching operation on one circuit.

[0005] However, the above conventional composite switch is large in size, also when the switch is used for switching operation on one circuit, the additional switch 305 has to be used, which requires large space in the audio apparatus, also the switches disposed at two different positions have to be respectively operated.

SUMMARY OF THE INVENTION

[0006] The object of the present invention is to address the conventional problems and aims to provide a composite switch which is small in size and performs simultaneous switching operation on two independent circuits, also has a function for short-circuiting two switching structures in the composite switch when the composite switch is used for switching operation on one circuit.

[0007] For realizing the above object, the composite switch of the present invention comprises:

(a) a first fixed contact unit and a second fixed contact unit disposed on the surface of a substrate in such a manner as to be symmetrical about a reference line which is vertical to the surface of the substrate,

(b) a first rotating contact unit which contacts with the first fixed contact unit or the second fixed contact unit, and, a second rotating contact unit which contacts with the second fixed contact unit or the first fixed contact unit, wherein both first and second rotating contact units are respectively held by a rotating member which rotates on an axis of the reference line,

(c) a first facing contact leg electrically connected to the first rotating contact unit, and a second facing contact leg electrically connected to the second rotating contact unit, wherein the first and the second facing contact legs are disposed in such a manner as to face each other across the reference line,

(d) a central movable contact member which enters into the state of electrical connection with the first and the second facing contact legs or electrical disconnection from the first and the second facing contact legs by moving along the reference line, and

(e) one or two operating shafts for rotating the rotating member and moving the central movable contact member along the reference line.

[0008] The above structure enables the decrease of size in a composite switch which performs simultaneous switching operation on two independent circuits and has a function for short-circuiting two switching structures in the composite switch for switching operation on one circuit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a cross sectional front view showing a composite switch in a first exemplary embodiment of the present invention,

Fig. 2 is an exploded perspective view showing the composite switch in the same,

Fig. 3 is a plan view showing the structure of contact members on the substrate of the composite switch in the same,

Fig. 4 is a schematic diagram showing the main portion of the contact structure of the composite switch in the same,

Fig. 5 is a cross sectional front view showing a state that the inner operating shaft of the composite switch locates at a pushed-position in the same,

Fig. 6 is a cross sectional front view showing a composite switch in a second exemplary embodiment of the present invention,

Fig. 7 is a cross sectional view taken in the line X - X of Fig. 6,

Fig. 8 is a cross sectional front view showing a composite switch in a third exemplary embodiment of the present invention,

Fig. 9 is an exploded perspective view showing the composite switch in the same,

Fig. 10 is a cross sectional front view showing a state that the inner operating shaft of the composite

switch locates at the pushed-position in the same,

Fig. 11 is a cross sectional front view showing a conventional composite switch, and

Fig. 12 is a circuit diagram showing an example of operation in the same.

DETAILED DESCRIPTION OF THE INVENTION

[0010] Hereinafter exemplary embodiments of the present invention are described on reference to illustrations.

First Exemplary Embodiment

[0011] Fig. 1 is a cross sectional front view showing a composite switch in a first exemplary embodiment of the present invention, Fig. 2 is an exploded perspective view showing the composite switch in the same, Fig. 3 is a plan view showing the structure of contact members on the substrate of the composite switch in the same, Fig. 4 is a schematic diagram showing the main portion of the contact structure of the composite switch in the same, Fig. 5 is a cross sectional front view showing a state that the inner operating shaft of the composite switch locates at a pushed-position in the same.

[0012] In Fig. 1 and Fig. 2, on the upper surface of a substrate 11, a pair of fixed contact units 12 and 13 are disposed symmetrically about a reference line 10 which is vertical to the surface of the substrate 11. The reference line 10 locates in such a manner as to passes through the center of the substrate, for instance. Also, as shown in Fig. 3, a center hole 111 is formed in a substrate 11 in such a manner that the center of the center hole 111 locates on the reference line 10.

[0013] As shown in Fig. 3, the fixed contact unit 12 comprises a semicircular (or circular arc of semicircle size) common contact member 121 disposed coaxially with the center hole 111 of the substrate 11, and, individual contact members 122 and 123 respectively disposed at the outer side of the common contact member 121 in such a manner as to be spatially isolated by a predetermined dimension from the common contact member 121, and, to be concentric with the common contact member 121, also to respectively locate at radial positions of a predetermined angular pitch.

[0014] Also, in the same manner, the fixed contact unit 13 comprises a semicircular (or circular arc of semicircle size) common contact member 131 disposed coaxially with the center hole 111 of the substrate 11, and, individual contact members 132 and 133 respectively disposed at the outer side of the common contact member 131 in such a manner as to be spatially isolated by a predetermined dimension from the common contact member 131, and, to be concentric with the common contact member 131, also to respectively locate at radial positions of a predetermined angular pitch.

[0015] In Fig. 2 through Fig. 4, a movable contact unit 14 made of an elastic thin metal plate has unitary structure comprising a doglegged elastic facing contact leg 142, and, a rotating contact unit 141 having a contact leg 161 which elastically contacts with the common contact member 121 or 131 and a contact leg 162 which elastically contacts with the individual contact member 122, 123, 132 or 133. The facing contact leg 142 and the rotating contact unit 141 are electrically connected since these are unitarily formed.

[0016] Also, a movable contact unit 15 made of an elastic thin metal plate has unitary structure comprising a doglegged elastic facing contact leg 152, and, a rotating contact unit 151 having a contact leg 171 which elastically contacts with the common contact member 131 or 121 and a contact leg 172 which elastically contacts with the individual contact member 132, 133, 122 or 123. The facing contact leg 152 and the rotating contact unit 151 are electrically connected since these are unitarily formed.

[0017] A rotating member 18 made of insulating resin comprises an upper cylindrical portion 181 and a lower flange portion 182. A round protrusion 183 formed at the center of the bottom of the flange portion 182 of the rotating member 18 engages with the center hole 111 of the substrate 11, and, the cylindrical portion 181 of the rotating member 18 engages with the cavity of the lower large-diameter cylindrical portion 192 of a driving unit 19 in such a manner that the rotating member 18 rotates according to the rotation of the driving unit 19 on the axis of the reference line 10.

[0018] The movable contact units 14 and 15 are respectively fixed by caulking to the lower side of the flange portion 182 of the rotating member 18. The doglegged facing contact legs 142 and 152 respectively protrude into the cavity 185 of the cylindrical portion 181 through respective holes 184 formed through the flange portion 182. The doglegged portion 143 of the facing contact leg 142 and the doglegged portion 153 of the facing contact leg 152 face each other across the reference line 10 in such a manner as to respectively protrude toward the center of the cavity 185 (i.e., toward reference line 10).

[0019] The outer operating shaft 191 of the driving unit 19 is rotatably supported by a supporting hole 201 formed through the upper cover portion of a case 20. At the upper end portion of the outer operating shaft 191, which protrudes through the supporting hole 201, an operating portion 193 is formed, on which an operating knob (not illustrated) is disposed.

[0020] A joggle-like-protrusion 221 of an annular leaf spring 22 engages with one of a joggle-like-cavities of a jagged portion 195 formed on the outer wall of the lower cylindrical portion 192 of the driving unit 19, whereby the rotating operation is steadily and moderately performed.

[0021] Through a center hole 194 formed through the outer operating shaft 191, an inner operating shaft 21 is disposed and held in such a manner as to be ver-

tically movable (i.e., movable along the reference line 10) by a predetermined dimension. At the upper end portion of the inner operating shaft 21, which protrudes upward through the center hole 194 of the outer operating shaft 191, an operating portion 211 is formed, on which an operating knob (not illustrated) is disposed. At the lower end of the inner operating shaft 21, which protrudes downward through the center hole 194 of the outer operating shaft 191, a central movable contact member 23 is fixed by caulking.

[0022] As shown in Fig. 1 and Fig. 2, the central movable contact member 23 has a swelled portion 231 of a predetermined diameter at the upper portion thereof. A U-shaped spring 24, which is held by the lower end of the outer operating shaft 191 of the driving unit 19, holds the central movable contact member 23 by elastically nipping the outer wall of the swelled portion 231.

[0023] In the state that the inner operating shaft 21 is pulled as shown in Fig. 1 (hereinafter the state shown in Fig. 1 is referred to as pulled-state or pulled-position of operating shaft), the U-shaped spring 24 locates at the lower end of the swelled portion 231 of the central movable contact member 23. In this state, the central movable contact member 23 is not electrically connected with the facing contact legs (142, 152).

[0024] As shown in Fig. 1 and Fig. 2, a U-shaped uniting member 25 made of metal is placed in such a manner as to cover a case 20, and, the outer operating shaft 191 and the inner operating shaft 21 are protruded through a hole 251 formed at the upper cover portion of the uniting member 25, and the lower leg portions 252 of the uniting member 25 is fixed to the lower side of the substrate 11 by caulking, whereby all of the components described in the above are united.

[0025] The operation of the composite switch of this exemplary embodiment having the above structure is described hereinafter.

[0026] First, the pulled-state of the inner operating shaft 21 is described. When the operating portion 193 of the outer operating shaft 191 is rotated in the state that the inner operating shaft 21 is at the pulled-position as in Fig. 1, the rotating member 18 rotates, and, the movable contact units 14 and 15 which are held by the lower side of the flange portion 182 of the rotating member 18 respectively slide on the fixed contact units 12 and 13 elastically contacting with these (12, 13).

[0027] In more detail, as shown in Fig. 4, the contact leg 161 of the rotating contact unit 141 of the movable contact unit 14 slides on the common contact member 121, and the other contact leg 162 of the same slides on the individual contact member 122 or 123 respectively elastically contacting with the contact members, and, the contact leg 171 of the rotating contact unit 151 of the movable contact unit 15 slides on the common contact member 131, and the other the contact leg 172 of the same slides on the individual contact member 132 or 133 respectively elastically contacting with the contact members.

[0028] In this case, when the outer operating shaft 191 is counterclockwise rotated, for instance, the contact leg 162 contacts with the individual contact member 122 first, then contacts with the individual contact member 123, and, the contact leg 172 contacts with the individual contact member 132 first, then contacts with the individual contact member 133, whereby electrical connection between the common contact member 121 and the individual contact member 122 or 123, and, electrical connection between the common contact member 131 and the individual contact members 132 or 133 are changed accordingly.

[0029] When the outer operating shaft 191 is further rotated counterclockwise, for instance, the contact leg 161 of the rotating contact unit 141 slides on the common contact member 131 and the other contact leg 162 of the same slides on the individual contact members 132 or 133 , and, the contact leg 171 of the rotating contact unit 151 slides on the common contact member 121 and the other contact leg 172 of the same slides on the individual contact member 122 or 123 respectively elastically contacting with these contact members.

[0030] In this case, as in the previous case, the contact leg 162 contacts with the individual contact member 132 first, then contacts with the individual contact member 133, and, the contact leg 172 contacts with the individual contact member 122 first, then contacts with the individual contact member 123, whereby the electrical connection between the common contact member 131 and the individual contact member 132 or 133, and, electrical connection between the common contact member 121 and the individual contact member 122 or 123 are changed accordingly.

[0031] The above change of the electrical connection is performed substantially simultaneously, and a signal based on the switching operation is sent out through terminals connected to the respective contact members.

[0032] As described in the above, the composite switch of this exemplary embodiment performs simultaneous switching operation on two independent circuits. In the above switching operation, the joggle-like-protrusion 221 of the annular leaf spring 22 engages with one of joggle-like-cavities of the jagged portion 195 of the driving unit 19, whereby the switching operation is performed steadily and moderately.

[0033] Next, the operation in the pushed-state of the inner operating shaft 21 is described hereinafter. When the operating portion 211 of the inner operating shaft 21 is pushed downward, the inner operating shaft 21 and the central movable contact member 23 fixed to the lower end of the inner operating shaft 21 moves downward, whereby the swelled portion 231 moves downward against the elastic nipping force of the U-shaped spring 24 which holds the lower end portion of the swelled portion 231 by nipping the same in the pulled-position of the inner operating shaft 21.

[0034] The central movable contact member 23 stops the downward movement thereof at the position where the U-shaped spring 24 comes to the upper end portion of the swelled portion 231 after passing through the most swelled portion of the swelled portion 231. The state that the movable contact unit 23 is pushed downward is shown in Fig. 5 (hereinafter the state of Fig. 5 is referred to as pushed-state or pushed-position of operating shaft). In the above operation, the U-shaped spring 24 works for steady and moderate pushing operation.

[0035] In the pushed-state, as shown in Fig. 5, the lower end portion of the central movable contact member 23 made of metal enters into the state of electrical connection with the respective doglegged portions (143, 153) of the facing contact legs (142, 152) pressing these portions (143, 153) diseward, whereby the two movable contact units 14 and 15 (i.e., the two common contact members 121 and 131) are electrically connected (i.e. short-circuited) each other through the central movable contact member 23.

[0036] Then, when the operating portion 193 of the outer operating shaft 191 is rotated, the driving unit 19 rotates together with the rotating member 18, whereby the contact legs 161 and 162 of the movable contact unit 14 slide on the fixed contact unit 12 or 13 elastically contacting with these, also the contact legs 171 and 172 of the movable contact unit 15 slide on the fixed contact unit 13 or 12 elastically contacting with these, in the same manner as in the case of the pulled-state. However, in the pushed-state, since the common contact members 121 and 131 are short-circuited, a signal obtained by the switching operation of the composite switch on two independent circuits is equivalent with a signal which is obtained by the switching operation of the composite switch on one circuit.

[0037] After that, when the operating portion 211 of the inner operating shaft 21 is pulled, the central movable contact member 23 moves upward and the composite switch comes back to the state of Fig. 1 (i.e., pulled-state). As a result, the central movable contact member 23 is disconnected from the facing contact legs (142, 152), and, the composite switch comes back to the state for switching operation on two independent circuits. In the operation of pulling back the inner operating shaft 21 also, the U-shaped spring 24 works for performing the operation steadily and moderately.

[0038] As described in the above, the above structure of the composite switch of this exemplary embodiment enables the decrease of both size and cost maintaining the functions for performing simultaneous switching operation on two independent circuits, and for performing switching operation on one circuit by short-circuiting between the two common contact members in the composite switch.

Second Exemplary Embodiment

[0039] In the composite switch of this exemplary embodiment, switching operation is performed by using one operating shaft, though two operating shafts are used in the first exemplary embodiment.

[0040] Fig. 6 is a-cross sectional front view showing the composite switch in the second exemplary embodiment, and Fig. 7 shows a cross sectional view taken in the line X - X of Fig. 6.

[0041] First, the structure of a composite switch in a second exemplary embodiment is described hereinafter on reference to Fig. 6 and Fig. 7.

[0042] In Fig. 6 and Fig. 7, a driving unit 264 comprises a lower large-diameter cylindrical portion 265 and an upper shaft portion 266, and, the cross section of the lower portion 261 of an operating shaft 26 is formed to be non-round of a shape which is identical with the shape of the hole 267 of the shaft portion 266 of the driving unit 264, but the dimensions of the cross section of the lower portion 261 of the operating shaft 26 is formed to be slightly smaller than the dimensions of the hole 267 of the shaft portion 266 of the driving unit 264. With the above structure, the lower portion 261 of the operating shaft 26 engages with the hole 267 of the shaft portion 266 of the driving unit 264, and, the operating shaft 26 and the driving unit 264 rotate together, also the operating shaft 26 is held in such manner as to be vertically movable by a predetermined dimension independently from the driving unit 264.

[0043] The outer wall of the shaft portion 266 of the driving unit 264 is shaped into round and the diameter thereof is substantially identical with the diameter of an operating portion 262 formed at the upper end portion of the operating shaft 26. On the operating portion 262, an operating knob (not illustrated) is disposed.

[0044] Next, the operation of the composite switch of this exemplary embodiment having the above structure is described hereinafter.

[0045] When the operating knob (not illustrated) is rotated, the operating shaft 26 and the driving unit 264 rotate together, whereby switching operation is performed, in the same manner as in the first exemplary embodiment, by the rotation of the rotating contact unit 141 of the movable contact unit 14 held by the lower side of the flange portion 182 of the rotating member 18, and by the rotation of the rotating contact unit 151 of the movable contact unit 15 held by the same.

[0046] Also, by pushing the operating portion 262, the two facing contact legs (142, 152) are electrically connected (i.e., short-circuited) each other, and by pulling the operating portion 262, the two facing contact legs (142, 152) are disconnected each other, in the same manner as in the first exemplary embodiment.

[0047] The composite switch having the above structure is usable for switching operation on two circuits and for switching operation on one circuit.

[0048] As described in the above, in this exemplary

embodiment, a composite switch which is smaller in size and superior in operational handiness can be realized.

Third Exemplary Embodiment

[0049] Fig. 8 is a cross sectional front view showing a composite switch in a third exemplary embodiment of the present invention, Fig. 9 is an exploded perspective view showing the composite switch in the same, and Fig. 10 is a cross sectional front view showing the state that the inner operating shaft of the composite switch locates at a pushed-position in the same.

[0050] The structure of the composite switch of this exemplary embodiment is different from that of the composite switch of the first exemplary embodiment as follows. A center hole 273 is formed through the outer operating shaft 271 of a driving unit 27. The outer operating shaft 271 comprises a large-diameter hole portion 276, a small-diameter hole portion 275, and a step portion 272 formed at a boundary between the large-diameter hole portion 276 and the small-diameter hole portion 275. An inner operating shaft 28 comprises an upper large-diameter portion 283 and a lower round small-diameter portion 282. The inner operating shaft 28 is inserted into the center hole 273, and a helical spring 29 is disposed in the center hole 273 in such a manner as to extends from the step portion 272 to the lower end of the upper large-diameter portion 283 of the inner operating shaft 28. The helical spring 29 presses upward the lower end of the upper large-diameter portion 283 of the inner operating shaft 28, whereby the inner operating shaft 28 is located at the pulled-position (refer to first exemplary embodiment). Also, the composite switch of this exemplary embodiment has a cylindrical central movable contact unit 31 having no swelled portion, though the swelled portion is formed in the first exemplary embodiment.

[0051] The other structure is identical with that of the first exemplary embodiment.

[0052] Further details of this exemplary embodiment is described hereinafter on reference to Fig. 8, Fig. 9 and Fig. 10.

[0053] In this exemplary embodiment, as in the first exemplary embodiment, the movable contact unit 14 has the doglegged facing contact leg 142 and the rotating contact unit 141 which elastically contacts with the fixed contact unit 12 or 13 formed on the substrate 11, and, the movable contact unit 15 has the doglegged facing contact leg 152 and the rotating contact unit 151 which elastically contacts with the fixed contact unit 13 or 12 formed on the substrate 11. The facing contact legs 142 and 152 face each other. The rotating member 18, which holds both movable contact units 14 and 15, is held by the lower cylindrical portion 274 of the driving unit 27. The outer operating shaft 271 of the driving unit 27 is rotatably supported by the supporting hole 201 of the case 20.

[0054] Also, the inner operating shaft 28 protrudes upward through the center hole 273 of the outer operating shaft 271, and has an operating portion 281 at the upper end portion thereof, on which an operation knob (not illustrated) is disposed.

[0055] However, in this exemplary embodiment, different from the first exemplary embodiment, the lower round small-diameter portion 282 of the inner operating shaft 28 engages with the hole of the small-diameter hole portion 275 of the outer operating shaft 271, and the upper large-diameter portion 283 of the inner operating shaft 28 engages with the hole of the large-diameter hole portion 276 of the outer operating shaft 271, and, the inner operating shaft 28 is pressed upward by the elastic force of the helical spring 29 inserted in the center hole 273. The spring 29 is disposed between the portion 283 and a step portion 272 of the center hole 273.

[0056] With the above structure, the inner operating shaft 28 is held to be vertically movable by a predetermined dimension, and, in the state that the inner operating shaft 28 locates at the pulled-position as shown in Fig. 8 by the elastic force of the helical spring 29, the cylindrical central movable contact member 31, which is fixed by caulking to the downward protruded end portion of the inner operating shaft 28, is electrically disconnected from the facing contact legs (142, 152).

[0057] Hereinafter, the operation of the composite switch of this exemplary embodiment having the above structure is described.

[0058] In the state that the inner operating shaft 28 is at the pulled-position as shown in Fig. 8, the composite switch performs switching operation on two circuits in the rotating operation of the operating portion 277 of the outer operating shaft 271, in the same manner as in the first exemplary embodiment.

[0059] On the other hand, as shown in Fig. 10, when the operating portion 281 of the inner operating shaft 28 is pushed downward against the upward pressing force of the helical spring 29, the inner operating shaft 28 and the central movable contact member 31 move downward, whereby the lower end portion of the central movable contact member 31 enters into the state of electrical connection with the facing contact legs (142, 152), which results in electrical connection (i.e., short-circuit) between the two movable contact units 14 and 15 (i.e., the electrical connection between the two common contact members 121 and 131 of the respective fixed contact units 12 and 13). In the state of the short-circuit, the composite switch performs switching operation on one circuit as described in the first exemplary embodiment.

[0060] After that, when the downward pushing force applied to the inner operating shaft is removed, the inner operating shaft 28 and the inner movable contact unit 31 respectively come back to the pulled-position as shown in Fig. 8 by the upward pressing force of the helical spring 29.

[0061] As described in the above, when the inner operating shaft is pushed downward, the composite switch of this exemplary embodiment performs switching operation on one circuit. The function that the electrical connection changes when the operating shaft is pushed can be applied for a push switch as well.

[0062] The composite switch of this exemplary embodiment can also be formed in such a manner as to be operated with one operating shaft as in the case of the second exemplary embodiment.

[0063] As described in the above, in the present invention, a small and low cost composite switch, which has a function of simultaneous switching operation on two independent circuits and a function of short-circuiting two switching structures inside the composite switch for switching operation on one circuit, is realized. Also, in the composite switch of the present invention, the operation can be performed steadily and moderately.

Claims

1. A composite switch comprising:

   (a) a first fixed contact unit and a second fixed contact unit disposed on a surface of a substrate in such a manner as to be symmetrical about a reference line which is vertical to the surface of said substrate;
   (b) a first rotating contact unit which contacts with one of said first fixed contact unit and said second fixed contact unit, and, a second rotating contact unit which contacts with one of said second fixed contact unit and said first fixed contact unit, wherein said first rotating contact unit and said second rotating contact unit are respectively held by a rotating member which rotates on an axis of said reference line;
   (c) a first facing contact leg electrically connected to said first, rotating contact unit and a second facing contact leg electrically connected to said second rotating contact unit, wherein said first facing contact leg and said second facing contact leg are disposed in such a manner as to face each other across said reference line;
   (d) a central movable contact member which enters into a state of one of electrical connection with said first facing contact leg and said second facing contact leg, and, electrical disconnection from said first facing contact leg and said second facing contact leg, by moving along said reference line; and
   (e) one of one operating shaft and two operating shafts for rotating said rotating member and moving said central movable contact member along said reference line.

2. The composite switch according to claim 1, wherein said first rotating contact unit and said first facing contact leg is unitarily formed with an elastic thin metal plate, and, said second rotating contact unit and said second facing contact leg are unitarily formed with an elastic thin metal plate.

3. The composite switch according to claim 1, wherein said composite switch comprises one operating shaft for rotating said rotating member and moving said central movable contact member along said reference line.

4. The composite switch according to claim 1, wherein said operating shaft stops movement thereof at one of a pulled-position and a pushed-position in the movement along said reference line.

5. The composite switch according to claim 1, wherein said operating shaft is forced to locate at a pulled-position by elastic force of an elastic member.

6. The composite switch according to claim 1, wherein

   said first fixed contact unit comprises a semicircular first common contact member and a plurality of first individual fixed contact members disposed in such a manner as to be concentric with said first common contact member and to respectively locate at radial positions of a predetermined angular pitch,
   said second fixed contact unit comprises a semicircular second common contact member and a plurality of second individual fixed contact members disposed in such a manner as to be concentric with said second common contact member and to respectively locate at radial positions of a predetermined angular pitch,
   said first rotating contact unit comprises a first contact leg and a second contact leg,
   said second rotating contact unit comprises a third contact leg and a fourth contact leg,
   wherein when said first contact leg contacts with said first common contact member and said third contact leg contacts with said second common contact member, said second contact leg alternately contacts with said plurality of respective first individual fixed contact members, and said fourth contact leg alternately contacts with said plurality of respective second individual fixed contact members, according to rotation of said rotating member,
   and, when said first contact leg contacts with said second common contact member and said third contact leg contacts with said first common contact member, said second contact leg alternately contacts with said plurality of respective second individual fixed contact

members, and said fourth contact leg alternately contacts with said plurality of respective first individual contact members, according to the rotation of said rotating member.

FIG. 1

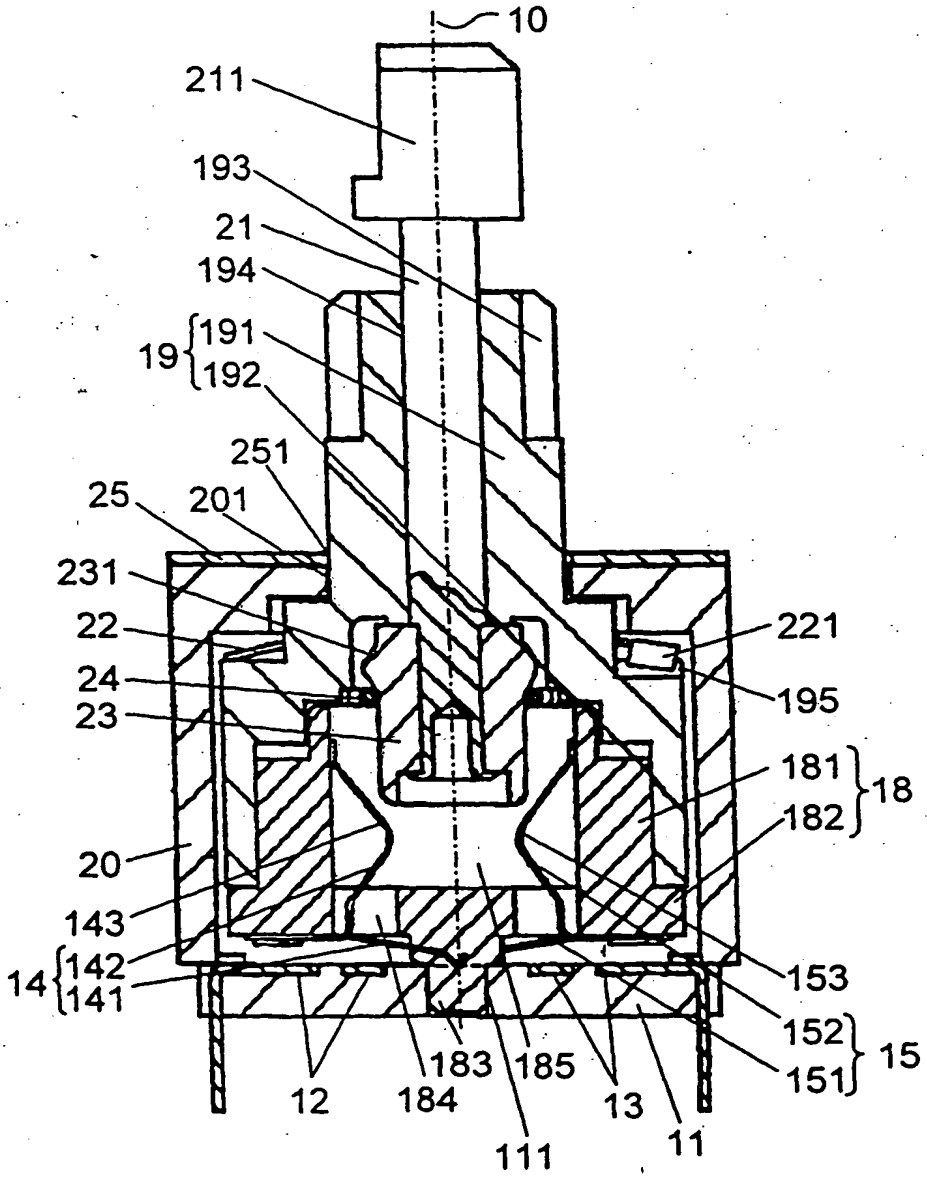
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FIG. 2

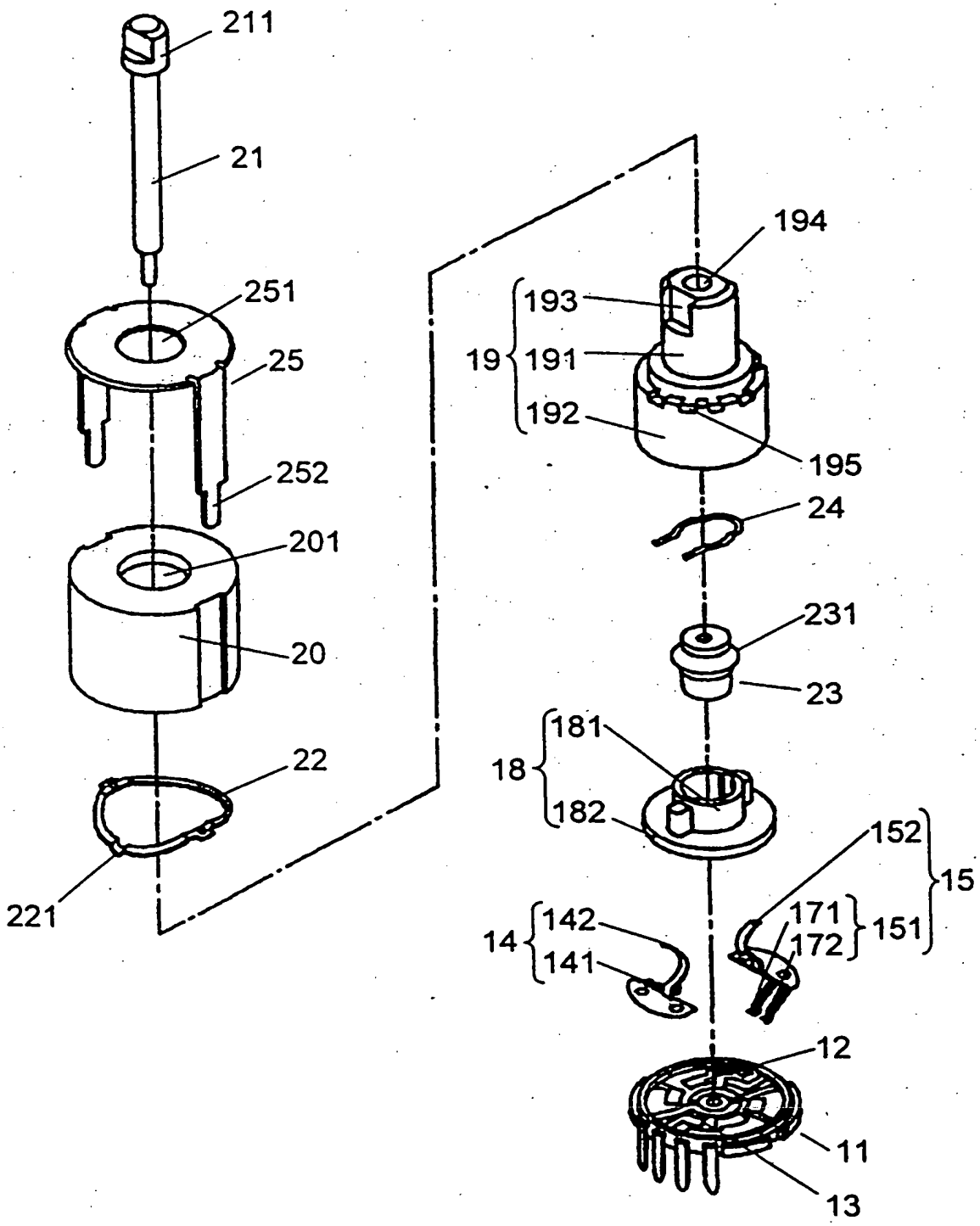
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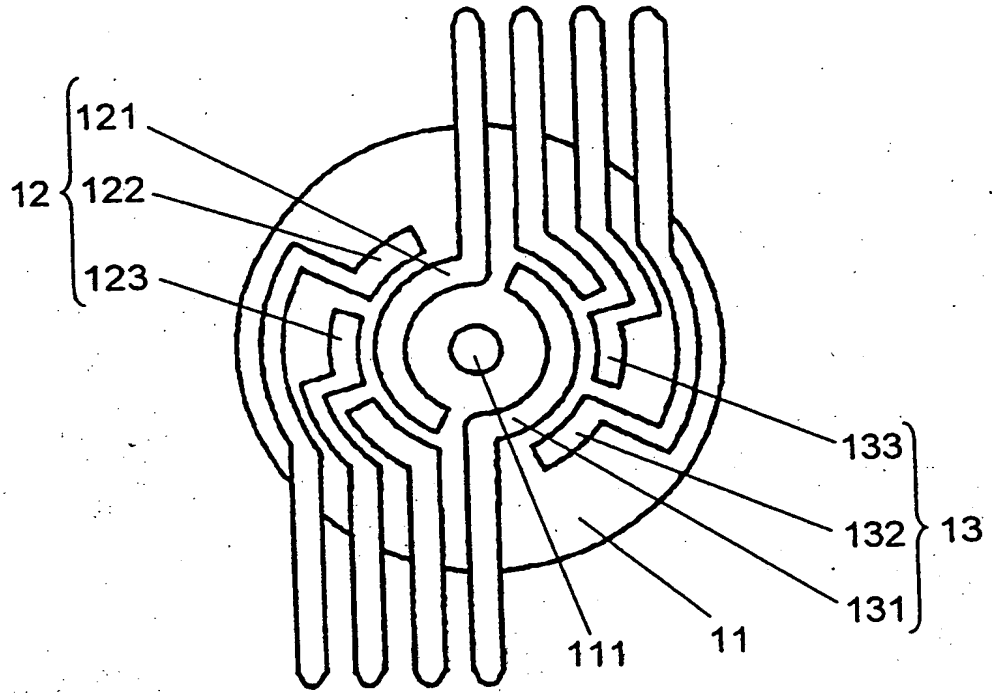
FIG. 3


121
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131
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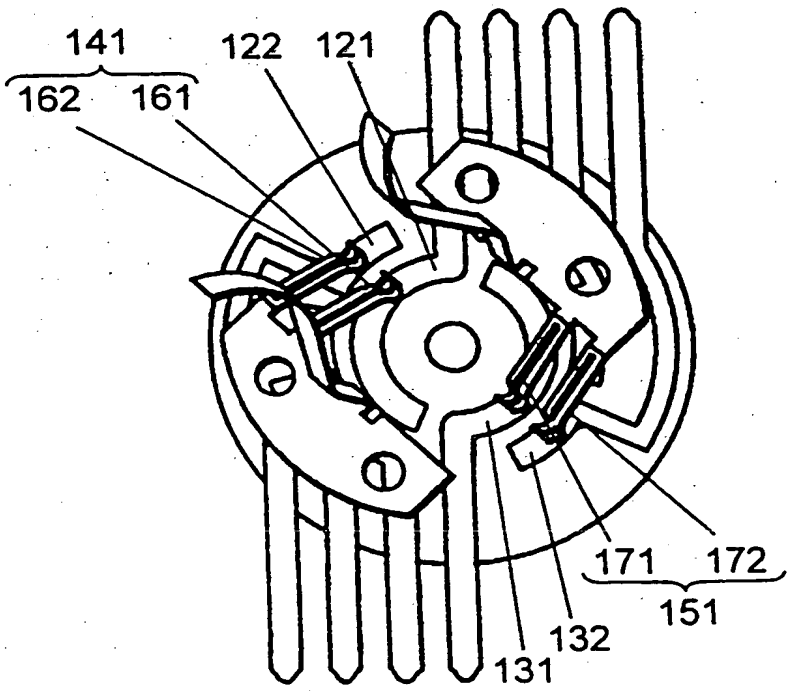
11

FIG. 4


141
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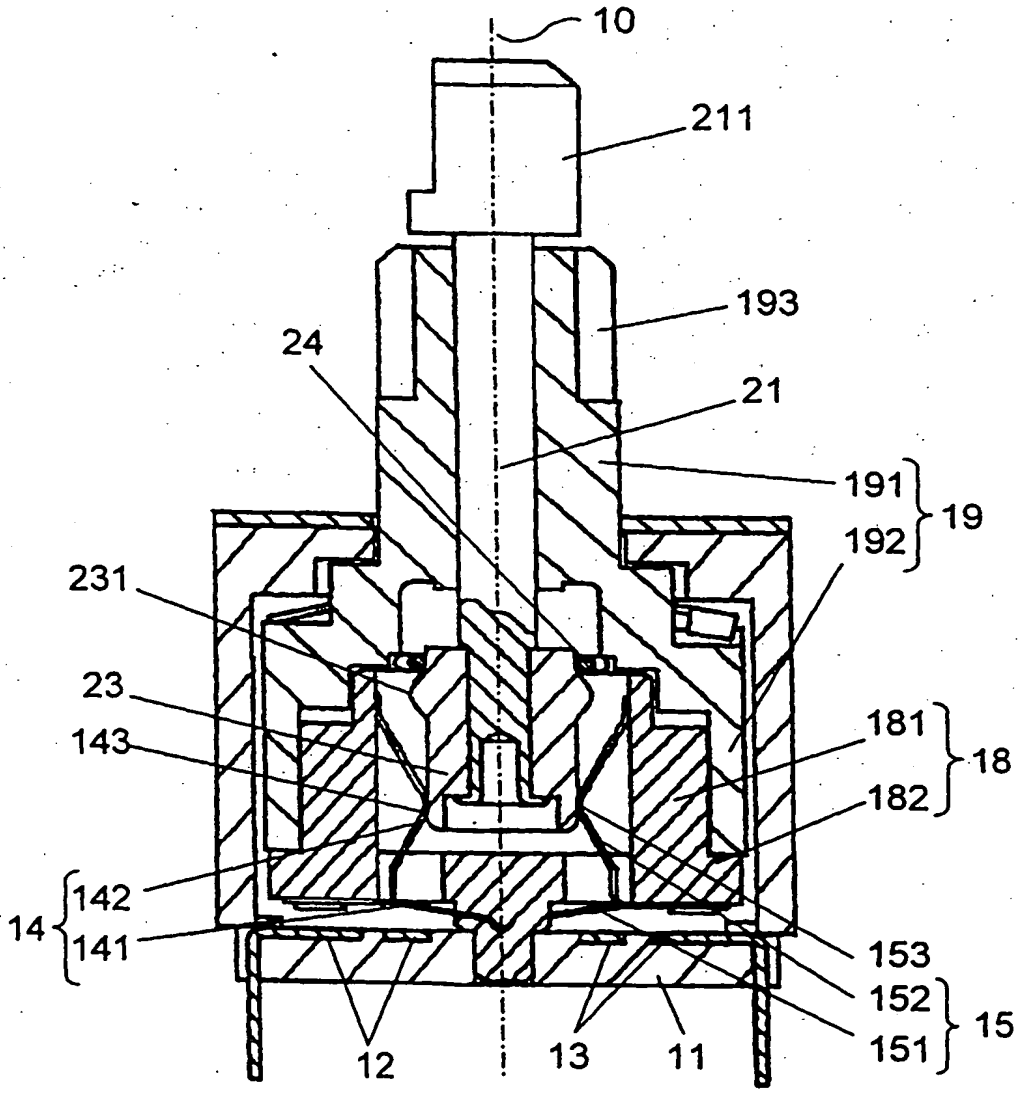
131

FIG. 5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182
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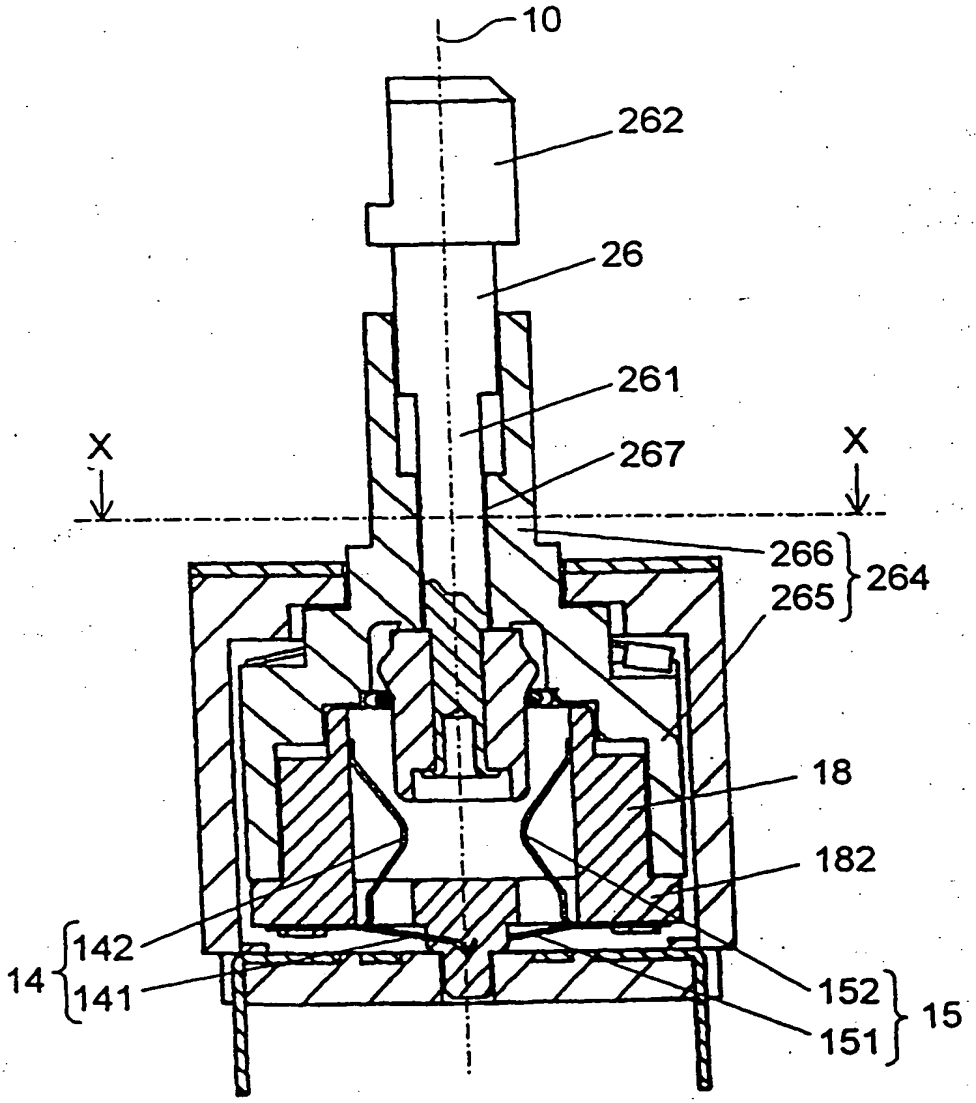
FIG. 6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262
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261
267
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X
266
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264
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182
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FIG. 7

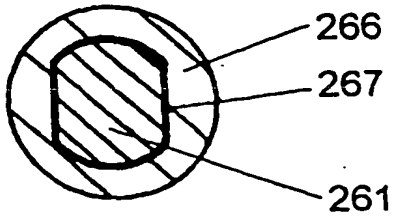
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FIG. 8

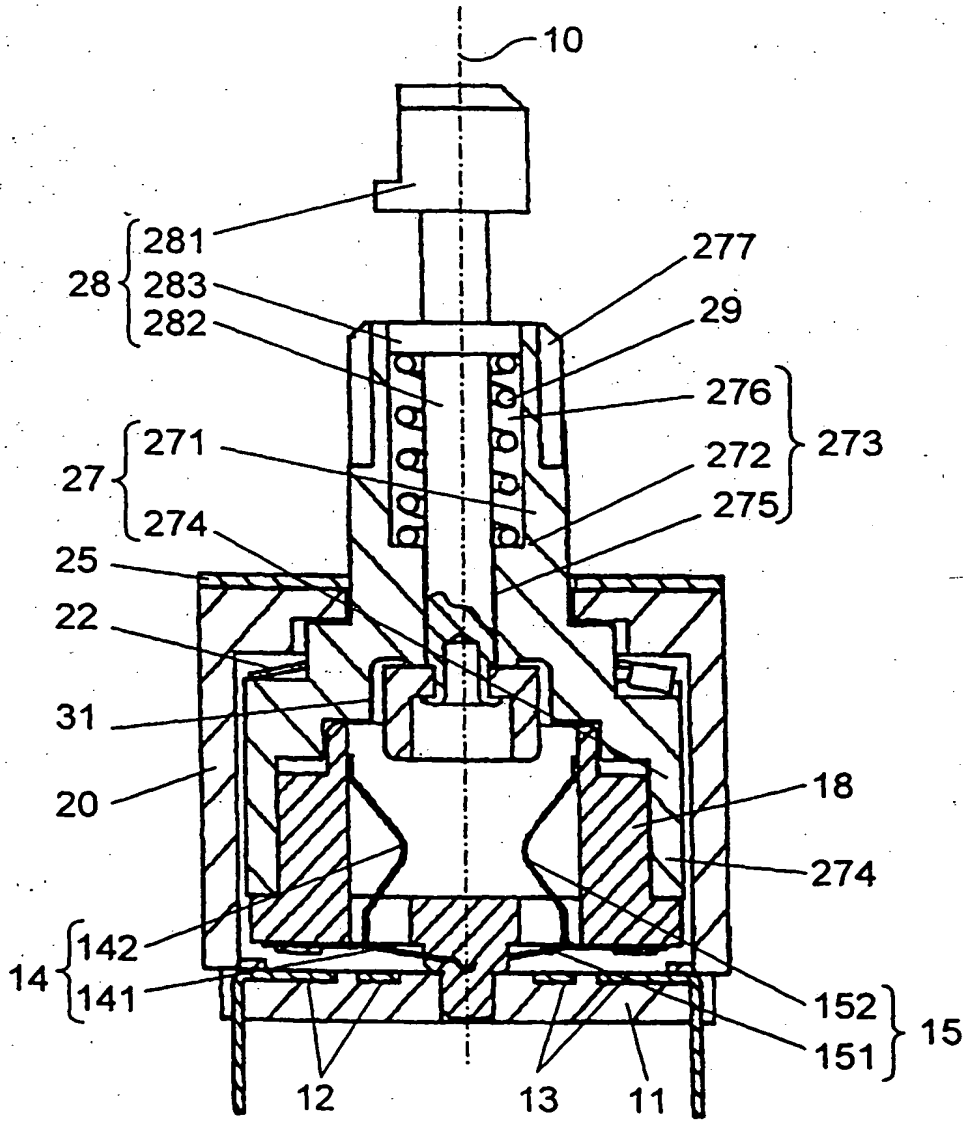
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FIG. 9

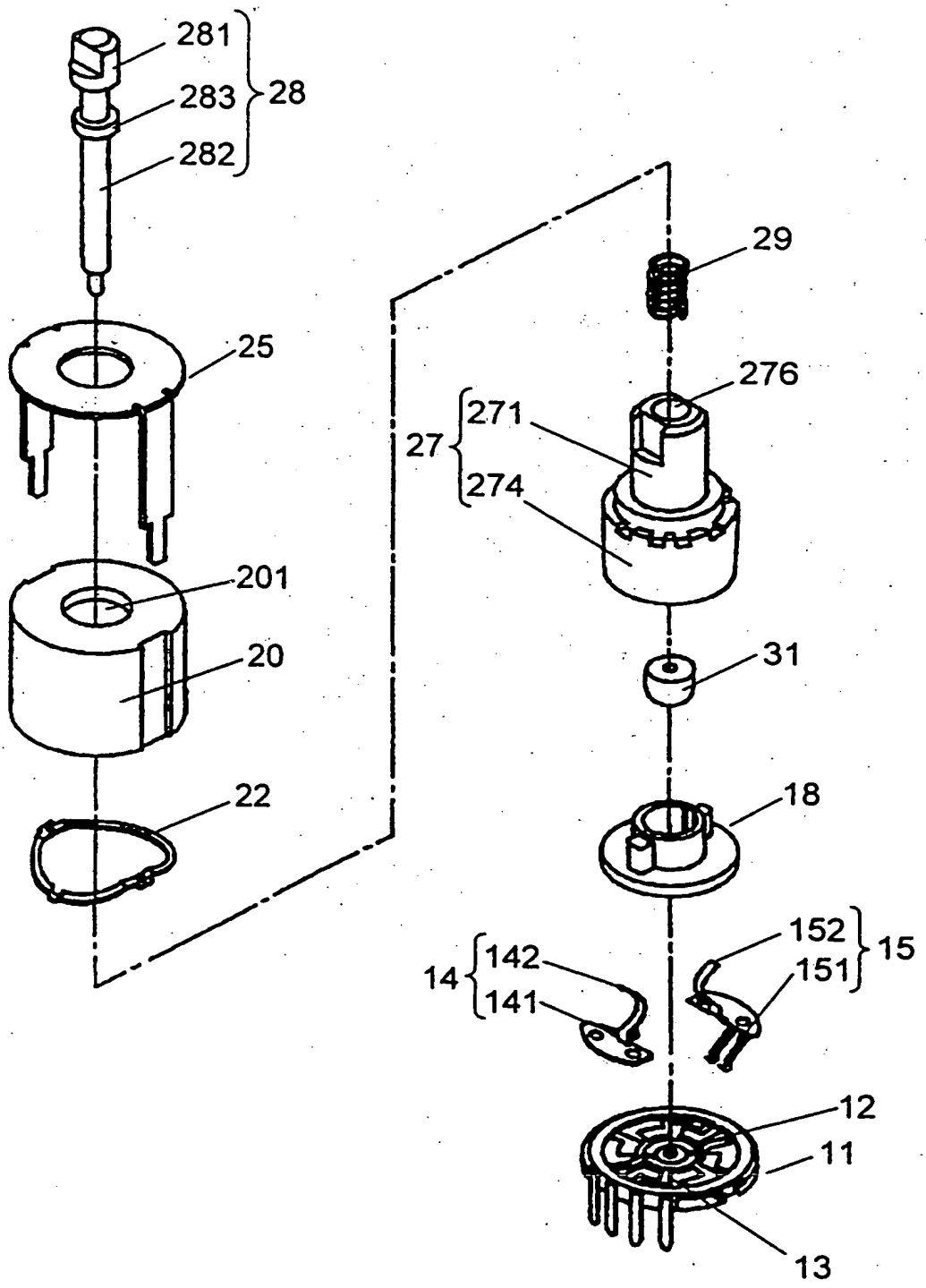
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FIG. 10

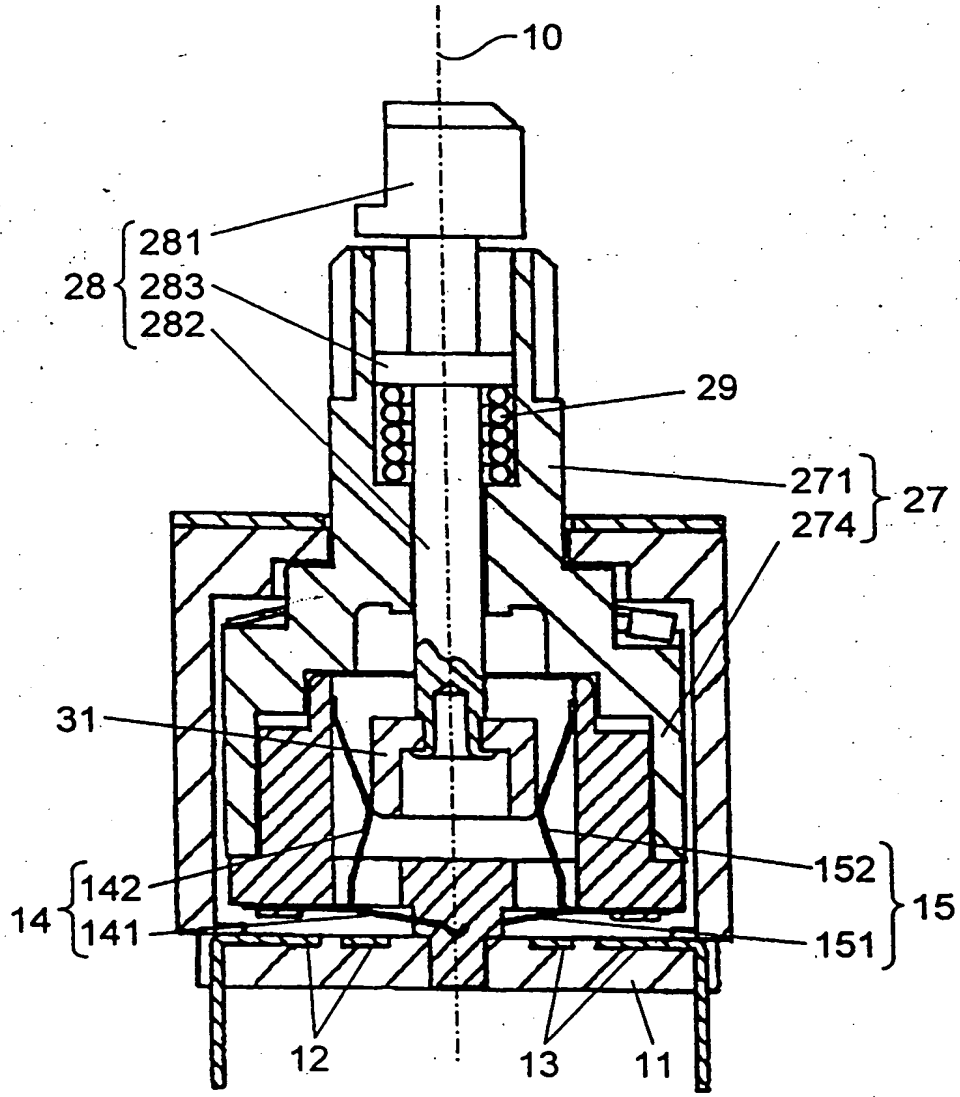

FIG. 11 PRIOR ART

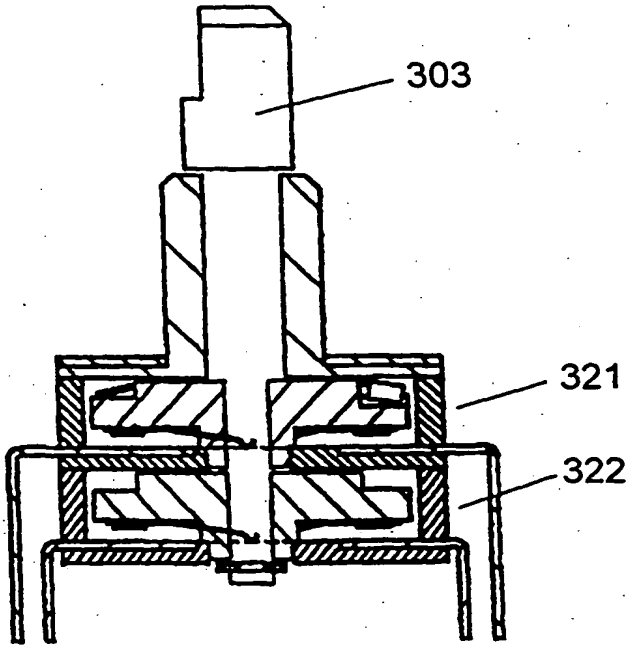

FIG. 12 PRIOR ART